Claims

[c1] 1. A method of gating for a medical imaging system, the method comprising:
selecting a non-electrical sensor from a group consisting of an acceleration sensor and a force sensor; and,
utilizing the non-electrical sensor to acquire information for gating.

[c2] 2. The method of claim 1 further comprising gating within a magnetic resonance imaging system.

[c3] 3. The method of claim 1 further comprising gating within a computed tomography imaging system.

[c4] 4. The method of claim 1 further comprising gating within a PET-CT imaging system.

[c5] 5. The method of claim 1 further comprising gating within an X-ray imaging system.

[c6] 6. The method of claim 1 further comprising gating within an ultrasound imaging system.

[c7] 7. The method of claim 1 further comprising determining timing of a gating signal to be prior to displacement of a body part of a patient.

[c8] 8. The method of claim 1 further comprising obtaining a gating signal using signature analysis.

[c9] 9. The method of claim 8 wherein using signature analysis includes providing a training set within a database and employing a pattern recognition technique to extract a gating signal.

[c10] 10. A method of gating for a medical imaging system, the method comprising:
selecting a non-electrical sensor from a group consisting of an accelerometer, force sensor, ultrasonic sensor, strain gage, photodiode, and pressure sensor; and,
utilizing the non-electrical sensor to acquire information for cardiac gating.

[c11] 11. The method of claim 10 wherein utilizing the non-electrical sensor comprises utilizing an accelerometer.

[c12] 12. The method of claim 11 further comprising sensing cardiac vibrations with the accelerometer and acquiring an acceleration waveform with the accelerometer.

[c13] 13. The method of claim 12 further comprising calculating a first derivative of the acceleration waveform to obtain a jerk waveform, determining a salient-peak of the jerk waveform, and utilizing the salient-peak as a trigger point for cardiac gating.

[c14] 14. The method of claim 10 further comprising obtaining a gating signal using signature analysis.

[c15] 15. The method of claim 14 wherein using signature analysis includes providing a training set within a database and employing a pattern recognition technique to extract a gating signal.

[c16] 16. A method of gating for a medical imaging system, the method comprising:
selecting a non-electrical sensor from a group consisting of an accelerometer and a force sensor; and,
utilizing the non-electrical sensor to acquire information for respiratory gating.

[c17] 17. The method of claim 16 wherein selecting a non-electrical sensor comprises selecting an accelerometer, the method further comprising obtaining an acceleration waveform with the accelerometer, integrating the acceleration signal twice to obtain a resultant signal, band pass filtering the resultant signal to remove frequencies that cause drift in the resultant signal and frequencies corresponding to cardiac motion to obtain a filtered signal, analyzing the filtered signal for salient peaks, and obtaining a trigger point for respiratory gating.

[c18] 18. A method of gating for a medical imaging system, the method comprising:
selecting a non-electrical sensor from a group consisting of an accelerometer, force sensor, ultrasonic sensor, strain gage, photodiode, interferometer, laser,

and pressure sensor; and,
utilizing the non-electrical sensor to acquire information for peripheral pulse gating.

[c19] 19. The method of claim 18 wherein selecting a non-electrical sensor comprises selecting an accelerometer, the method further comprising arranging the accelerometer on a wrist of a patient.

[c20] 20. The method of claim 19 further comprising obtaining an acceleration waveform from the accelerometer, calculating a time delay for information being transmitted from a heart of the patient to a peripheral pulse, and characterizing the signal.

[c21] 21. A sensor assembly comprising:
a non-electrical sensor adapted for resting on a vibrating surface; and,
a patient-sensor interface having a first end and a second end, the first end adapted for securing to a patient, the second end coupled to the sensor.

[c22] 22. The sensor assembly of claim 21 further comprising a sensor box for acquiring information from the sensor.

[c23] 23. The sensor assembly of claim 22 further comprising means for signal processing and computer analysis, wherein the means for signal processing and computer analysis receives input from the sensor box.

[c24] 24. The sensor assembly of claim 21 wherein the patient-sensor interface is fluid-filled, non-metallic, non-conducting tube.

[c25] 25. A method of using a sensor for gating, the method comprising
providing a non-electrical sensor;
providing a fluid filled transmission tube having a first end and a second end;
attaching the first end of the fluid filled transmission tube to the patient; and,
attaching the second end of the fluid filled transmission tube to a sensor.

[c26] 26. The method of claim 25 further comprising placing the sensor out of a field of view during an imaging process.

[c27] 27. The method of claim 25 wherein the patient has a heart, and wherein attaching the first end of the fluid filled transmission tube to the patient comprises attaching the first end to a chest wall of the patient adjacent the heart.

[c28] 28. The method of claim 25 wherein the patient has a radial artery within a wrist, and wherein attaching the first end of the fluid filled conduction tube to the patient comprises attaching the first end to the wrist.

[c29] 29. The method of claim 25 further comprising connecting the sensor to a sensor box via an electrical connection for recording information acquired by the sensor.

[c30] 30. The method of claim 29 further comprising sending information from the sensor box to a signal processing and computer analysis station.

[c31] 31. The method of claim 25 wherein providing a non-electrical sensor comprises providing a sensor having a bandwidth of at least 125 Hz.

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